LOUISIANA STATE UNIVERSITY

Environmental Hazards Analysis
ENVS 4262

Hazards analysis is the systematic process of hazards identification, vulnerability determination, and consequence assessment for the natural, built, and human environment. The goals of the class are:

(1) to provide a systematic framework for examining the nature and consequences of natural and man-made hazards; and
(2) to examine strategies that may be taken to plan, respond, recover, prevent, or mitigate hazards.

The class will provide a comparison of approaches to hazards analysis used by federal agencies including the U.S. Environmental Protection Agency, Federal Emergency Management Agency, U.S. Department of Transportation, Corps of Engineers, and the Centers for Disease Control. An examination of hazards in the following areas will provide a basis for comparing approaches to hazards analysis:

- Accidental releases of hazardous chemicals in transport (rail, motor carrier, and barge)
- Accidental releases of hazardous chemicals from fixed sites/processes (EPA).
- Risks associated with flooding (FEMA's Flood Insurance Program)
- Environmental Justice (EPA)
- Centers for Disease Control (CDC) Risk Screening for Public Health
- Hurricane Vulnerability Assessment: Wind and Storm Surge (Corps of Engineers)

Class Readings: A bibliography containing readings from each of the above areas will be provided by the instructor. Cases and readings will be assigned for each class session.

Student Assessment:

4 Class Assignments:	50 points each
Class Project:	150 points
Examination:	100 points

Class members will be asked to apply the hazards analysis process in an area determined by the student's research interest. The nature and extent of the project will range from a description of a potential project to a limited application of the project. Students will be asked to present a summary of their report to the class for discussion during the last two weeks of the class.

Undergraduate students will be asked to read one or more of the assigned readings. Graduate students will be expected to read all assigned readings listed below as well as selected additional class references noted in the outline below. Graduate students will be asked to demonstrate a broader understanding of the nature of the hazards that provides the context of their report. As an example of a broader understanding of the hazards, graduate students will complete as part of their class project, an extensive examination of the literature that addresses their hazard.

Grading

92-100	=	A
82-91	=	B
72-81	=	C
62-71	=	D
< 62	=	F

Instructor: John C. Pine, Associate Professor, Institute for Environmental Studies
45 Atkinson Hall
(225) 388-1075 FAX (225) 388-4286 Email: jpine@lsu.edu

1. Risks in the 21st Century: The need for research methodology in environmental hazards analysis

Rubin, Claire B. What Hazards and Disasters are Likely in the 21st " Century - or Sooner? Boulder, CO: Natural Hazards Research and Applications Information Center. Natural Hazards Research Working Paper #99. See: <http://www.colorado.edu/hazards/wp/wp99.html>

National Academy of Public Administration, "Coping With Catastrophe: Building an Emergency Management System to Meet People's Needs in Natural and Manmade Disasters," February 1993.

Chakib Kara-Zaitri, "Disaster prevention and limitation: state of the art; tools and technologies," *Disaster Prevention and Management: An International Journal*. Pp. 30-39, Vol. 5, Number 1, 1996.

The H. John Heinz III Center for Science, Economics, and the Environment. *The Hidden Costs of Coastal Hazards: Implications for Risk Assessment and Mitigation.* Island Press. Washington, DC 2000.

2. Disaster Modeling: Tools, Technology and Applications

Drager, K. Harald, Gunnar G. Lovas, J. Wiklund and Helge Soma. "Objectives of Modeling Evacuation from Buildings During Accidents: Some Path-Model Scenarios," *Journal of Contingencies and Crisis Management*. Vol. 1 #4, Dec. 1993.

Fischer, Henry W. III. "The role of the new information technologies in emergency mitigation, planning response and recovery." *Disaster Prevention and Management*. Vol. 7 Number 1 MCB University Press. 1998.

Slap, Albert J., Daniel Hillman, and David Moore. "Expert Systems in Emergency Response," *The ASPEP Journal.* 1998. (pp. 93-98).

Additional Class References:

Goodchild, Michael F.; Parks, Bradley O.; Steyaert, Louis T. *Environmental modeling with GIS*. Oxford University Press: New York. 1993.

Walker, George R. "Current Developments in Catastrophe Modelling," Financial Risk Management for Natural Catastrophes. Edited by Neil R. Britton and John Oliver. Proceedings of a conference sponsored by Aon Group Australia Limited. 1997.

3. Hazards Analysis: Methodology and Meta-Data Requirements

Federal Emergency Management Agency (FEMA), EPA, and DOT. *The Handbook of Chemical Hazards Analysis Procedures*. Washington, D.C. 1997. (Chapters 1-4).

U. S. Environmental Protection Agency. *Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances*. U.S. EPA, FEMA, and U.S DOT. Washington D.C. 1987. (Chapters 6, 8-11).

USGS. "Natural Hazards." *USGS Fact Sheet*. January 1999.

Class Project Assignment #1: Evaluating EPA's Chemical Databases

4. Issues in Hazards Analysis and Modeling (Part I)

Kirkwood, Alan Sidney, "Why do we worry when scientists say there is no risk?" *Disaster Prevention and Management, An International Journal*. Vol. 3 No 2, 1994 pp. 15-22.

Denis Smith. "On a Wing and a Prayer? Exploring the Human Components of Technical Failure," MCB University Press, <http://www.co.uk/confhome.htm> 1996.

Additional Class Reference

Fortune, Joyce, and Geoff Peters. *Learning from Failure: the systems approach*. New York, NY: John Wiley & Sons, 1995.

5. Community Hazards Analysis: EPA's Risk Screening and Environmental Indicators

EPA (1999). "Risk Screening and Environmental Indicators." <www.epa.gov/opptintr/env_ind/index.html>

EPA (1999). "EPA's Framework for Community-Based Environmental Protection." Office of Policy Office of Reinvention, EPA 237-K-99-001.

6. Transportation Risks

Cutter, Susan L. Minhe Ji. "Trends in U.S. hazardous materials transportation spills," *The Professional Geographer*, Vol. 49, No. 3, 1997.

Lovett, A. A., J. P. Parfitt, and J. S. Brainard. "Using GIS in risk analysis: A case study of hazardous waste transport." *Risk Analysis*, Vol. 17 No. 5, 1997.

Pine, John C., Emo Sajo, and Rebecca East. An Assessment of the Transportation of Extremely Hazardous Substances for the Southern Mississippi River Corridor. *Journal of the American Society of Professional Emergency Planners*, November 1998.

Class Project Assignment #2: Assessing the methodology and data in transportation risks.

7. EPA's Risk Management Plans

U.S. Environmental Protection Agency. General Risk Management Program Guidance. July 1998. See: <http://www.epa.gov/swecepp/ap-gegu.htm>

Additional Class Resource:

National Environmental Publications Information
<http://www.epa.gov/clariton/index.html>
More than 6,000 U.S. Environmental Protection Agency (EPA) publications are available for searching, viewing, and printing through this site. Links are available to Technical Information Packages (TIPS); environmental terms; and the publications catalog of EPA's National Center for Environmental Publications and Information.

8. Environmental Racism

EPA. "Inclusion of Environmental Justice in Comparative Risk Projects." January 1995. <http://www.epa.gov/opperspd/just/appendix.htm>

Foreman, Christopher H. Jr. "A Winning Hand? The uncertain future of environmental justice," *The Brookings Review*, Spring 1996, Vol 14 No.2, Pages 22-25
<http://www.brook.edu/PUB/REVIEW/foresp96.htm>

Perlin, S.A., Setzer, R.W., Creason, J., and Sexton, K. Distribution of Industrial Air emissions by Income and Race in United States: An approach using the toxic release inventory, *Environmental Science and Technology*, 29(1), 1995.

Yandle and Burton: Reexamining Environmental Justice: A Statistical Analysis of Historical Hazardous Waste Landfill sitting patterns in Metropolitan Texas. *Social Science Quarterly*, September 1996, Volume 77, Number 3, pp.477-492.

Additional Class Reference:

EPA/230-E-92-008, Environmental Equity: Reducing risk for all communities (2 volumes) <http://www.epa.gov/opperspd/just3.htm>

EPA, Interim Final guidance for incorporating Environmental Justice concerns in EPA's NEPA Compliance Analyses. September 30, 1996.

Class Project Assignment #3: Approaches to Environmental Racism

9. Inland Flood Modeling

"Edward Kiester, Jr. "Water, Water, Everywhere." *Smithsonian*. Washington, D.C.: August 1997, Vol. 28, No. 3. Pp. 34-45.

"Stream-Gauging Program of the U.S. Geological Survey," U.S. GEOLOGICAL SURVEY CIRCULAR 1123, Reston, Virginia, 1995, By Kenneth L. Wahl, Wilbert O. Thomas, Jr., and Robert M. Hirsch. <http://water.usgs.gov/public/realtime.html>

Parker, Dennis, Maureen Fordham, Sylvia Tunstall, and Anne-Michelle Ketteridge. "Flood warning systems under stress in the United Kingdom," *Disaster Prevention and Management: An International Journal*. Vol. 4 #3, 1995 pp. 32-42.

Additional Class Reference:

Haimes, Yacov Y. Krzysztofowicz, Roman; Lambert, James H.; Li, Duan; Tulsiani, Vigay. Army Corps of Engineers. Institute for Water Resources. "Risk Based Evaluation of flood warning and preparedness systems," Volumes 1 & 2. Water Resources Support Center National Technical Information Service, Springfield, Va. November 1996.

10. Hurricane Storm Surge Modeling

Corps of Engineers, New Orleans District, Department of the Army "SLOHS: (Technical Data Report) Southeast Louisiana Hurricane Preparedness Study, August, 1994.)

11. The Environment and Public Health - Risk Screening

Pine, J. C. and J. Diaz (2000). Creating a Community Environmental Health Profile using GIS: A Tool for risk Screening. *Journal of Environmental Health.*

Mielke, H.W. (1999), "Lead in the Inner Cities," *American Scientist*, 87:62-73.

ATSDR ( ). "A Primer on Health Risk Communication Principles and Practices." <http://www.atsdr.cdc.gov/HEC/primer.html>

Additional Class Resources:

ATSDR Science Corner
<http://atsdri.atsdr1.cdc.gov:8080/cx.html>
ATSDR Science Corner is a gateway to environmental health information and resources. It is a simple and user-friendly guide to search the World Wide Web for environmental health information. The primary focus is to find and share global information resources on the linkage between human exposure to hazardous chemicals and adverse human health effects.

ATSDR Minimal Risk Levels for Hazardous Substances
<http://atsdr1.atsdr.cdc.gov:8080/mrls.html>
This site lists ATSDR's minimal risk levels (MRLS) for hazardous substances. An MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse noncancer health effects over a specified duration of exposure.

Combined Health Information Database (CHID)
<http://chid.nih.gov>
CHID is a federally produced bibliographic database of health information, education, and promotion resources. Current information producers include the Centers for Disease Control and Prevention, National Institutes of Health, Office of Disease Prevention and Health Promotion, and the Health Resources and Services Administration. The database contains descriptions of health education and promotion programs underway at the state and local levels. It provides bibliographic citations and abstracts of journal articles, books, reports, pamphlets, audiovisuals, and other health resources. It also provides program contacts and source and availability information so that users can follow up directly. CHID is updated in January, April, July, and October. If you would like to share your program efforts through the database with other health professionals, contact the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) at NCCDPHP/TIESB, 4770 Buford Highway, NE, MS K13, Atlanta, GA 30341-3724 or call (770) 488-5080.

Environmental Health Policy Committee
<http://web.health.gov/environment>
The Environmental Health Policy Committee (EHPC) of the US Department of Health and Human Services (DHHS) promotes the exchange of environmental health information and provides review, advice, and consensus facilitation where necessary on environmental health research, exposure assessments, risk assessments, and risk management procedures for DHHS. The site contains EHPC reports, publications, and policy statements; meeting and training information; and a search engine linked to environmental databases.

Class Project Assignment #4: Assessing Public Health Risks

12. ATSDR Environmental Health Risk Assessment

U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, Division of Health Studies, Epidemiology and Surveillance Branch, Hazardous Substances Emergency Events Surveillance (HSEES) (1999) Annual Report. <http://www.atsdr.cdc.gov/HS/HSEES/annual97.html>

ATSDR (1994). "Petitioned Public Health Assessment, Marine Shale Processors, Inc. St. Mary Parish, LA," *CERCLIS NO. LAD981057706, October 17, 1994* Prepared by: U.S. Department of Health and Human Services Public Health Service, Agency for Toxic Substances and Disease Registry. Division of Health Assessment and Consultation, Atlanta, Georgia <http://www.atsdr.cdc.gov/HAC/PHA/marinesp/msp_toc.html>

ATSDR (1999). Public Health Assessments. <http://www.atsdr.cdc.gov/HAC/PHA/foreword.html>

Class Paper Due

13. Terrorism and Weapons of Mass Destruction

ATSDR (1999). "Industrial Chemicals and Terrorism: Human Health Threat Analysis Mitigation and Prevention." CDC. <http://www.atsdr.cdc.gov/OFP/terrorism/indterr.html>

Additional Reference:

GAO (1999). *Combating terrorism: need for comprehensive threat and risk assessments of chemical and biological attacks.* National Security Division. Washington DC.

Hoffman, Bruce R. *Inside Terrorism*. NY: Columbia University Press (1998).

Simon, Jeffrey D. The terrorist Trap: *America's experience with terrorism*. Indiana University Press. Bloomington, In 1994.

Discussion of Class Papers

14. Hazards Analysis and Application Needs

National Academy Press. "Technology: Research Problems Motivated by Application Needs, *"Computing and Communications in the Extreme: Research for Crisis Management and Other Applications."* Washington, D.C. 1995. PP. 1-30. Available on the Internet at <http://www.nap.edu/readingroom/books/extreme>.

Discussion of Class Papers